

## CAPE NATIONAL FORESTS.

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We are now importing yearly 5,000,000 cubic feet of timber, mostly pine (average of last two years, 4·93). This comes from four sources: Germany and Russia, Sweden, and America. Of these sources of supply, it is only in Germany that the forests are being scientifically conserved and worked with a regard to the future. The present value of the German forests, capitalised at  $2\frac{1}{2}$  per cent. (which is a fair, all-round estimate, though some of them yield as much as 5 per cent.), amounts to the enormous sum of £100,000,000 sterling! The prices obtained for wood in Germany have more than doubled during the last half-century. These are average prices. In some localities the competition of coal and iron has reduced the value of wood.

In Russia, an impecunious Government has leased large areas of forests to factories and mill-owners, who are destroying it so rapidly that the climate is becoming impaired. The Russian famine of four years ago was caused by drought, attributed by local scientific authorities to the rapid destruction of the forests.

In Sweden most of the forest is in the hands of private owners. It is steadily going the way of all such forest. Much of the wood that reaches the Colony from Sweden is, within my observation, young and immature. Witness the wooden sleepers imported by Government a few years ago.

The forests of America are in process of rapid destruction. The period at which the destruction will be so far advanced as to stop exportation has been variously estimated at from twenty to fifty years. To some extent this point will depend on the growth of the sentiment in favour of scientific conservation, the first effect of which will be a diminution of supplies. There is a strong and rapidly growing feeling in America in favour of national forests. Large areas of forest lands have been quite lately set aside for this purpose. The forest reserves established under the Act of March 3, 1891, amounted to 60,851 square miles. These became final in

March, 1898. Further extensive reservations were made by President Cleveland on the very eve of his retirement.

So far then as these four sources of supply are concerned, an early exhaustion of three is to be looked for, and the fourth (Germany) in the future will want all its timber for home use. What have we then to take their place? Very little abroad. The remaining forests of the cold temperate zone are less accessible, and can only be worked economically with a considerable rise in present prices.

In Great Britain, Dr. Nesbit tells us, out of 3,000,000 acres of woodlands only 2 per cent., or ninety square miles (about the area of the Knysna forest region), are the property of the State. England pays £17,000,000 yearly for imported wood, of which about £14,000,000 is for wood that could be grown equally well in the British Isles.

In the warm temperature zone the forests are chiefly composed of hardwoods, which though precious locally and for certain uses, are not likely to long affect the general timber supply of the world. It is true that there are vast stores of hardwood, mostly eucalypt, in Australia, and that some of this, chiefly jarrah and karrie, is now coming to South Africa for sleepers and wood-paving. The combined karrie and jarrah imports during the last four years averaged 63,000 cubic feet yearly, *i.e.*, only one-eightieth of our present total wood imports. Australia itself imports pine wood on much the same scale as South Africa. The Colony of New South Wales imported for home consumption pine or allied soft wood:—

1895-96	...	...	...	£287,398
1896-97	...	...	...	318,411

In the tropics the forests are composed almost entirely of hardwoods that can never take the place of pine and deal for house-building purposes. Though a tropical pine exists, it is little more than a botanical curiosity. Tropical countries will never produce pine timber, much less export it.

We have therefore to look for a rise in the price of imported wood; and when the time comes, a rapid enhancement (for reasons stated above) of the £250,000 we now pay yearly for imported wood. It behoves us therefore to plant largely, and at once, so as to reduce as soon as possible this heavy drain on the country—to set our house in order against the day when this drain will be still further increased. The exact proportion that the wooded area of a country should bear to the whole cannot be dogmatically laid down,

but it is accepted in the forest schools and universities of Europe :

1. That the proportion of woodlands to the total area of a country should not be less than 25 per cent. in populous countries like Europe.
2. The woodlands of a country to be scientifically worked and effectively maintained must be either owned or managed by the State. The latter proposition may sound bureaucratic, and to trench on that liberty of the subject on which an Englishman prides himself ; but this is not so. It is simply an outcome of the fact that forest management to be effective must be perpetual. It is accepted, equally in the military Republic of France, in Imperial Germany, in Austria, and even in democratic Switzerland, where no official can legally be appointed for more than three years at a time. As the outcome of this principle the valuable forests, owned by municipalities in France, Germany, Austria, and Switzerland are managed by the Government forest officers, the net forest revenues only being paid to the owners. And as a result, the very considerable municipal forests of these countries form part of the effective and permanent forest areas of these countries. Italy, Spain, Sweden, and the minor States follow the same policy more or less completely. The proportion between the area under forest and the total area of a country is an important consideration. What that proportion should be will, of course, vary with the circumstances of the country. A damp insular country suffers less from the want of forest than a dry inland country. England pays the foreigner £14,000,000 yearly for imported wood which, on almost every ground, would be better produced at home. Climatically, however, England suffers nothing from the loss of its forests. But for inland or arid countries the loss of forest means loss every way. Germany and Russia have 26 per cent. and 42 per cent. respectively of their area under forest. In Russia the forests are badly distributed. In Germany the forests are well distributed, and are a perpetual source of wealth and strength to the country: of wealth in the wood they produce ; of strength in the million or so of strong men who work in, and live by the forests. Now in Germany the forest reserves are most jealously guarded. It is held that there are some minor defects of distribution, but that the total area cannot be reduced, and that 25 per cent. is the minimum quantity of forest area necessary for a country situated as is Germany. It is calculated that one million people live directly on the forests of Germany, and three millions indirectly, *i.e.*, on forest industries. Directly and indirectly the German forests support 12 per cent. of the population. The area under forest in Cape Colony (including the Transkei) is barely over  $\frac{1}{4}$  per cent.

(0·29 per cent.), or, in other words, to raise Cape Colony to the European and Indian standard its woodlands would have to be multiplied eighty-six times. Sad indeed is it to reflect that small as these national forests are, they are held on an uncertain tenure—a tenure that would satisfy no prudent landowner or business man of any sort.

The following table shows the area under forest in Cape Colony, compared with that in some other countries :—

Countries.	Area under Forest in Acres.	Percentage under Forest of Total Area of Country.
Russia in Europe .. .. .	527,427,000	42
Sweden .. .. .	42,366,000	42
Austria .. .. .	46,856,000	31
Germany .. .. .	34,350,000	26
Norway .. .. .	18,920,000	25
India .. .. .	140,000,000	25
France .. .. .	20,750,000	16
Portugal .. .. .	1,666,000	5
Great Britain and Ireland.. .. .	2,790,000	4
Cape Colony .. .. .	353,280	0·29

From this it will be seen that Cape Colony stands far below these other countries in its proportion of forest, while the climate of the country is such that it ought to have a percentage under forest at least equal to Germany. Dryness is the characteristic of the climate, and imported timber has to come 6,000 or 7,000 miles by sea.

Nine-tenths of the wood required is pine. For the last two years the average importation, in million cubic feet, has been : Pine, 4·57; pine and all other woods, 4·93. Pine plantations can be produced all over the south-west districts at from £2 to £3 per acre. The pine sowings on the Tokai Flats have cost about £1 5s. per acre, and at Uitvlugt £2 5s. 6d., while £8 per acre would be a moderate price for producing an average timber plantation under less favourable circumstances. It is necessary to augment the forest reserves by every possible means, and the readiest and most remunerative way to do this is by means of pine sowings. With these figures before us, it seems incredible that in Cape Colony the area of woodlands is only  $\frac{1}{4}$  per cent. of the total area of the country. Though this is a sad figure, the case is not quite so bad as might appear at first sight. It is only the fertile coast districts that can ever carry a population at all comparable to that of Europe, and thus have a like demand for wood. The coast districts possess at present the whole area of indigenous forest—areas that are being extended and enriched by the more or less complete application of sound Forest Conservancy. But in the south-west districts the indigenous forest that once clothed the mountains of the sea-board

has been almost obliterated by mismanagement, and it now remains to restore, as quickly and as economically as possible, a certain area by means of plantations. The railway system of the country, and the various centres of population indicate where these forests can most economically be placed.

Following the example of Germany and Central Europe, we should form : (1) Village plantations like that of Worcester, to be paid for on the £ for £ principle jointly by Government and Municipalities, to remain the property of the Municipalities, but always managed by the Government forest officers ; (2) larger Government plantations, like those at Tokai and Uitvlugt, near Cape Town, at Ceres Road and Fort Cunynghame, adjoining the railways, and managed and owned by Government. Such plantations, to be economical, must be situated within minimum rainfall limits of 15 or 20 inches per annum. At some distance inland these rainfall limits can only be secured by going a certain distance from the railway on to the mountains. The Cedarberg mountains are a case in point.

Is planting profitable? The Worcester plantation is the only one of the plantations that is as yet old enough to have produced a marketable crop. At the end of the first crop this plantation, which is only 60 acres in extent, showed a net profit of £4,338 after deducting all expenses of formation and management, or £3,438 allowing interest at 3 per cent. on the cost of formation.

As a further example of the profits derivable from a blue-gum plantation on a farm, the following extract from "Tree-planting, 1893," may be cited : "As an illustration of the value of a blue-gum fuel copse let us take the case of a few acres planted near the homestead of a farm. An ordinary household in fairly well-to-do circumstances uses four or five tons of coal, or its equivalent, per year. One acre of blue-gum copse in fair growth will yield continually ten tons (dry weight) of wood fuel per year. The cutting up of the small wood yielded by the copse is not expensive ; but let us suppose that of this ten tons of wood nearly one-half goes in working expenses, and that from 1 acre of blue-gum copse we only obtain the net equivalent of five tons of coal : we arrive then at the conclusion that 1 acre of blue-gum copse will keep a household always comfortably supplied with fuel free of cost. What this free fuel means, in pounds, shillings, and pence, will of course depend on circumstances. To a household in the suburbs of Cape Town it means about £15 a year. In many other Colonial towns where wood has to be brought from a distance it means more. At Knysna the cost of transport makes wood fuel dearer than at Cape Town.

## WORCESTER PLANTATION: BLUE-GUM.

		RECEIPTS.		EXPENDITURE.	
		£	s. d.	£	s. d.
1892.	Up to December, 1892, the account stood—Receipts	9,695	13 9	...	...
	Gross expenditure since formation of the plantation, including railage on wood to Kimberley	...	...	9,287	14 1
1893.	Receipts, Kimberley Contract	3,246	17 2	...	...
	Local sales	263	18 8	...	...
	By expenditure—Railway transport on timber	...	...	1,623	8 7
	Working expenses at Worcester	...	...	253	7 3
1894.	Receipts, Kimberley Contract	2,817	17 7	...	...
	Local sales	381	12 10	...	...
	By expenditure—Railway transport on timber	...	...	1,408	18 10
	Working expenses at Worcester	...	...	562	9 7
1895.	Receipts	1,497	0 5	...	...
	Local sales	577	6 1	...	...
	By expenditure—Railway transport on timber	...	...	748	10 3
	Working expenses at Worcester	...	...	257	16 10
	Interest for 15 years on £2,000 at 3 per cent.	...	...	900	0 0
	BALANCE (net profit)	...	...	3,438	1 1
		18,480	6 6	18,480	6 6

To many a farmer free fuel means the saving of the scanty indigenous trees on his farm—the beauty, the shade, the water, and the shelter for stock, produced by these trees. To every one who has the means we would counsel the planting of an acre of blue-gum copse near the house or homestead. It will render the surroundings more healthy and pretty. Under favourable circumstances it will cost about £7 (planting 5 feet by 5 feet), and will repay its cost twice over the first year. It may be allowed to grow untouched for ten to twelve years, and then cut over gradually during the next ten years; and so on, in perpetuity, one-tenth of an acre being cut over and ten tons wood harvested, each year.”

The Uitvlugt Forest Reserve is the Epping Forest of Cape Town. Situate within four miles of the heart of the city, it comprises 8,000 acres in one solid block, stretching from behind Rondebosch across to Maitland and northwards along the line of railway. It should be the future playground of the citizens of Cape Town, like the beautiful forests dotted round Paris. Already it is the only large area remaining unfenced near Cape Town. Game is increasing, and the money beginning to come in for shooting licences will enable us to do more towards preserving the game. It is the only spot in South Africa where re-forestation has been conducted on a large scale by the inexpensive process of simply ploughing the land and scattering the seed broadcast. From six to eight tons of cluster-pine seed are used yearly in this work, and it is easy to imagine oneself in Germany as one walks for half a day over acre upon acre of young pines, stretching over the rolling flats as far as the eye can reach, and bounding the horizon on every side. And we have here what they have not got in Germany—long stretches of the estate covered with *Acacia saligna*, the golden wattle of West Australia, bursting into blossom. The wind blows loaded with the sweet scent, the colouring is most vivid, and with the backing of Table Mountain and the hum of the city in the distance, the shadows and sunshine on the mountain and the soft spring air, I know of no prospect more enchanting in this beautiful Cape Peninsula.

Though cluster-pine closely grown in dense plantations will be quite a different wood from that of the sparsely grown firewood tree, and be largely used for house-building, as is indeed now the case at Genadendal, there is one employment for which the coarsest and roughest cluster-pine timber can always be used. I refer to railway sleepers. Lately we imported wooden sleepers. Now we are importing costly iron sleepers, and misusing for sleepers the Knysna yellow-wood, that ought to go into flooring boards. No

doubt one of the most important uses for cluster-pine timber in the future will be for railway sleepers. It will be interesting therefore to consider what yield of cluster-pine sleepers might be expected from a plantation, say, on the Cape Flats, and also what would be the cost of such sleepers. As regards yield, there are no old regular plantations of cluster-pine on the Flats. Measurements have therefore been taken in the most regular cluster-pine plantations that could be found elsewhere. Two determinations have been made at Newlands and one at Plumstead. The first Newlands sample area yielded an average acre-increment (firewood and timber combined) of 178 cubic feet. The second sample area has given an acre-increment of 170 cubic feet. Both sample areas were taken through woods of even density and fair growth, both were only eight years of age. Older trees would undoubtedly have given a higher acre-increment. From the Plumstead trees an acre-increment as high as 300 cubic feet was obtained. The better portions of the Uitvlugt Reserve present a growth which is nearly or quite equal to that obtained from the sample areas at Newlands. However, making allowances for lesser growth generally on the Flats, and for a considerably lesser growth on certain of the shallow soils of the Flats, it seems fair to assume a general average increment of 100 cubic feet of wood per acre per year for cluster-pine plantations on the Flats.

A simple calculation shows that if two-thirds the area of the Uitvlugt Reserve, or 5,524 acres, were planted with cluster-pine, there would be produced annually 138,400 sleepers, assuming with an annual acre-increment of 100 cubic feet, that five-eighths of the wood production would be timber fit for sleepers, and that a sleeper contains  $2\frac{1}{2}$  cubic feet. This is considerably above the annual supply of sleepers now obtainable (but which will be less hereafter) from the Knysna forests. They could be supplied from Uitvlugt at a fraction of the cost from Knysna, or of the imported sleeper, and would appreciably cheapen the cost of railway construction in this portion of the Colony.

The working expenses of timber put on to the railway trucks at Worcester averaged during 1895  $1\frac{1}{3}$ d. per cubic foot. The cost of transport from the more distant parts of the Uitvlugt Reserve would average 3d. or 4d. per sleeper for the whole area. The plantation charges amount to £11 7s. 8d. per acre at the end of thirty-five years, *i.e.*, 3,500 cubic feet are produced at a cost of £11 7s. 8d., equal to 0.78d. per cubic foot, and the cost of the wood in a sleeper is thus 0.78d. by 2.46 cubic feet, equal to 1.92d., say twopence per sleeper. The manufactured cluster-pine sleeper put on the railway



at Uitvlugt would cost 11d., or 2s. 7d. creosoted on the spot, at Knysna rates :—

	£	s.	d.
Plantation charges .. .. .	0	0	1·92
Felling, dressing, and loading into trucks (Worcester rate of 1·3d. per cubic foot) .. .. .	0	0	3·20
Transport as above .. .. .	0	0	2
Sawing 8 feet superficial at 3s. 6d. per 100 feet .. .. .	0	0	4
Creosoting, <i>vide</i> quotation for half-round sleepers .. .. .	0	1	8
Total .. .. .	£0	2	7·12

The Uitvlugt Forest Reserve may be expected in thirty-five years to yield 7,733,600 sleepers at a cost to the country of 2s. 7d. each. The same sleepers imported have cost 5s. 6d. each. (Average cost from May, 1882, to January 1891, *vide* report of Superintendent of Sleepers for 1891.) Blue-gum and black-wood sleepers cut from local forests in Tasmania are produced at a cost of 2s. 6d. each delivered on the railway. The actual yield from seventy acres of mixed forest, of medium quality, at Uitvlugt, is reported thus by the district forest officer: "An area of seventy acres mixed pine and wattle plantation has been cut over; only half the wattle was cut, as the bark on the remainder was too light for tanner's use. The yield was 60,630 lb. bark, and brought in a net revenue of £45 9s. 6d., or 13s. per acre. The firewood from the barked wood from 30 acres has been sold, fetching £64, or £2 2s. 8d. per acre. The value of the Port Jackson bark on trees still standing, I estimate, is worth 6s. per acre, and the wood 18s. The cluster-pine, taking its value as firewood only, I estimate at £2. Adding these amounts together gives £5 19s. 8d. as the present selling value of the crop of this class of plantation. The plantation is ten years old, so the annual income is 12s. per acre."

So much for the vigorous-growing common woods. Special trees are being grown in the Government plantations to meet special wants. There is no really elastic wood like ash or hickory in South Africa. Various kinds of ash are now being cautiously tried. When we cross the Gamtoos River and say goodbye to sneezewood, the only other durable natural timber in South Africa is Clanwilliam cedar. For bridges, fencing-standards, and other outdoor work a durable timber is in constant demand. Imported pine, even when creosoted, is but a temporary expedient for such imperishable timbers as sneezewood and Clanwilliam cedar. While those two woods are not being lost sight of, we are growing, as durable timbers, in the plantations: jarrah, karrie, rostrata gum, sugar gum, tereticorni gum, iron barks, and other durable gums, as well as the

camphor-tree, the two pencil cedars, the catalpa, and various cypresses yielding durable fragrant and easily worked woods.

One hundred miles nearly due north of Cape Town begins the rugged and lofty Cedarberg Range. I hope very soon to see the restoration of the once fine cedar forests going forward at the rate of an acre a day. Last summer fire was successfully excluded from the whole of the demarcated forest area. The Clanwilliam cedar (*Callitris arborea*) is noteworthy as being the only valuable indigenous timber that lends itself easily to reproduction from broadcast sowings *in situ*. Seed is obtainable at the same price as pine seed. This cedar is the only indigenous timber that is at the same time durable, easily worked, and not liable to shrink, crack, or warp on seasoning. It has at the same time a most delicious fragrance when cut, and is no doubt one of the valuable timbers of the world. Trees of large size were formerly obtainable.

The exact influence of forests on climate is a much controverted point. This may be taken as established: that the general action of forests is to moderate temperatures and to more evenly distribute subsoil moisture. Forests render days cooler and nights warmer. They dry up swamps and subsoil moisture, but keep the soil moderately moist at the surface by protecting it from sun and wind. They have a slight and varying influence on the direct rainfall. Their chief and most beneficent influence is as storers of moisture. This they do in three ways:—

1. Their foliage stopping sun and wind checks evaporation.
2. The forest soil-humus has wonderful water-absorbing powers. It holds about ten times as much water as a sandy soil.
3. The forest subsoil is penetrated and opened up by the deep-reaching roots of forest trees. Roots of vigorous forest trees will penetrate pot-clay and burst asunder massive rock.

The effect of all this is to retain in our midst the water that would otherwise rush off to the sea. Who that has watched South African rivers in flood has not been impressed by the wealth of water, and indeed soil too, rushing purposelessly away to the ocean? The country is mountainous and elevated, and a large part of its rainfall is thus practically lost. The actual rainfall is often enough if only we could keep it from running away into the sea. Our coast districts average as much rain as the east of England, our dry Karoo has as much rain as central Spain, but our sun is hotter, our winds more powerful and drying. Hence the wonderful climatic utility of forest in South Africa!

Says that accurate observer Gilbert White of Selborne:—"Trees perspire profusely, condense largely, and check evaporation so much

that woods are always moist; no wonder therefore that they contribute much to pools and streams." In South Africa, on account of the hotter sun and more drying winds, the protective or water-conserving action of forest is greater than in England. Several cases have been brought to my knowledge in South Africa where streams have dried up or diminished after clearances and have again increased in strength with the restoration of the forest. At Knysna the roads are only kept dry enough to be passable by cutting, and by keeping cut, at considerable expense, the forest bordering the roads. To produce its full moisture-conserving effect the forest must be dense and composed preferably of slow-growing species.

This then is the action of forest on moisture under ordinary climatic conditions. Under certain extreme conditions of drought trees will lower and exhaust the little remaining subsoil moisture, while their watery exhalations will have little appreciable effect in moderating the parched atmosphere, and their protective covering to the soil is of no use since all superficial moisture has vanished. In America and other countries there usually exists a belt of poor open forest between the dense forest of the fertile country and the treelessness of the quite arid country. It is probable that in the open forest of this intermediate zone the trees exhaust more moisture than they conserve, at any rate during droughts, and can thus only subsist in a sparsely scattered condition. Scattered trees and open forest in most cases exhaust more moisture than they conserve. Hence the erroneous conclusions not infrequently drawn by unskilled observers as to the true action of complete, viz., dense forest. Very fast-growing trees such as the casuarina in India, the blue-gum and other eucalypts in South Africa, use up enormous quantities of water in their vegetative process, and usually (especially as young trees) exhaust more moisture than they conserve. This has happened with the casuarina plantations in Mysore and the Braamfontein plantations near Johannesburg. A common effect of blue-gum planting may be referred to here. The blue-gum is a native of a cool, damp climate. When planted in a dry, warm climate it is singularly active in drying up marshes, wells, springs, and all moisture that is within reach of its powerful vegetation functions. We see here in fact the struggle for existence of a young vegetative giant too often misplaced by man!

To obtain the maximum water-conserving action of forest dense masses of slow-growing trees (preferably of the pine class) should be planted. All trees, the water-exhausting trees such as eucalypts especially, pour vast quantities of water vapour into the atmosphere. When and how that vapour will condense into precious rain and

grateful cloud it is the province of the meteorologist to study. It will be readily seen that only large forest areas will ordinarily produce an appreciable effect in this way on the rainfall, and this effect is exceedingly difficult to determine by instrumental observation. Similarly, the effect of trees in causing "drip" and attracting thunderstorms is not easily measured and is usually but partial and local. The certain and beneficent action of forest, as we have seen, is in arresting the rush of water to the sea and preserving it from evaporation. To a country situated as in South Africa, there is here a positive and practical gain that bulks largely in considering the utility of national forests.

The way to make national forests the health, wealth, and glory of a community is clear. Make them now while the gold and diamonds supply the funds, and they will remain with us—a perpetual source of public weal, like the forests of Germany, when the gold and diamonds are done. Peru made railways in the rich early guano days. It is possible to make too many railways, to overstimulate agriculture in a climate of scanty and uncertain rainfall; but a strong forest policy is open to no misgiving. We now spend a quarter of a million yearly on imported wood. We shall soon spend more. £250,000 yearly at 3 per cent. represents a capital of £8,333,300, which is more than one-fourth the National Debt of the Colony.

Nor is this all: one million people, as we have seen, live directly on the forests in Germany; three millions indirectly. Not only are we sending one quarter of a million pounds sterling out of the country yearly, but we are keeping from us the population that would be supported by the expenditure of this money in the country—a population that need not be coloured, like the mine labourers, but white, as the farmers and the bulk of the wood-cutters at Knysna.

I hope I have succeeded in showing that national forests are worth more to this country than is generally supposed. One hears much of fruit-culture. Many of our leading men have put their hands deep into their pockets over fruit. One can scarcely open a daily paper without some reference to the fruit industry. Young men come out from England to seek a fortune in fruit-growing. Almost every farm has its patch of fruit trees. I know too much of the climates of California and Cape Colony not to believe in fruit-growing myself. But after all, what is fruit compared to forestry! Mr. Merriman, in his speech of last May to the Horticultural delegates, estimated the total value of the fruit produced in Cape Colony at £100,000. Our most successful fruit-grower has assured me that this is its outside value. Now look at the forest figures. During

the last two years we have paid an average of £269,349 for wood imported into Cape Colony. Nearly the whole of this wood will be produced at a fraction of this figure in Cape Colony itself when the national forests have reached the modest figure of about 50,000 acres, or 78 square miles only (assuming an average acre-increment of 100 cubic feet for pine plantations). The average value of the imported wood, nearly all sawn pine, is about 1s. per cubic foot. On good arable ground in the south-western districts sawn pine-wood can be produced, as we have seen, at from 4d. to 6d. the cubic foot. This is from *in situ* sowings. But even where transplants have to be used and young trees planted, the cost under favourable circumstances is not much more. In the larger forest nurseries, notably at Fort Cunynghame, near King William's Town, young forest trees are now produced ready for transplanting at a cost of only 7½d. per 100.

Taking Germany as our model, with one-fourth of its area forest worth at the present day £100,000,000, it is certain that we have but to follow in the footsteps of Germany to cover our National Debt by means of a national asset—the State forests. As compared with Germany, we have a climate that is not always favourable to the tree growth, but this may be said to be more than compensated for by the rapid growth of trees in the favourable districts.

Most important of all, when we have got our forests we must learn how to keep them. For the last fifteen years the Forest Department has laboured at building up the Forest Reserves, and this work of forming the national forests has been highly supported by Parliament. The last Estimates voted for the Forest Department totalled £60,135. In the settled parts of the country all that remains of the indigenous forest has been brought under systematic management, and plantations of the more valuable exotic timbers are going forward at the rate of about 5½ million trees yearly on 1,800 acres. Three and a half million trees on 1,049 acres are the figures for the Western Conservancy for 1897. But there is a danger, more especially in a British community, where the sentiment in favour of national forests is not so strong as on the Continent of Europe, that, yielding to temporary pressure, slices of the national forests may be alienated. Lately it has been ascertained that there is a flaw in the Forests Act, and that such alienations are possible. In Australia it has been found advisable to remove the railways from political control. Forests, far more than railways, demand a settled policy and fixed governance. After all railways can be made, bought, and sold like any other commodity. Not so forests. Their restoration may be a work of several generations, and involve an expenditure out of all

proportion to what was obtained from their alienation. The re-foresting of the Table Mountain range from Tokai to Cape Town is a case in point.

A few years back the Inspector-General of Forests to the Government of India went on a tour through some of the Australian forests, and before leaving addressed a pregnant letter to the Government of Victoria. What he most insisted on was the necessity of at once demarcating the national forests and rendering them safe from alienation, an inviolable national property. I look forward with confidence to the time when the national forests of the country will, after the railways, be its most precious possession, its most thriving industry. He said *inter alia*: "The forests of a country must be looked upon as a capital left in trust for the whole community: the interest alone should be consumed. It is easy of proof, both by historical evidence gathered from all parts of the globe and by the result of modern scientific inquiries, that a certain proportion of a country must be maintained under forest cover in order to secure the permanency of national progress and prosperity. The percentage of forests which it is necessary to maintain varies considerably with local conditions, but the fact remains that it is easier to deforest the superfluity of forest land than to recreate forests where they have been devastated and are found wanting. It is consequently a matter of great importance that the Government of a new country should make up its mind as early as possible, both with regard to the extent of permanent forest reserves and their final situation, *that the areas selected should be made inalienably safe for serious special reasons of State*, and that they should be treated for the one purpose of permanent retention under forest cover."

That forests can thrive where agriculture is difficult or impossible, one has only to recall the steep, richly wooded slopes of the lofty Amatolas, the similarly beautiful forest with its gigantic yellow-wood trees in the barren Knysna country, and, perhaps most striking of all, the cedar-trees of Clanwilliam, growing on the absolutely bare rocks of the stupendous Cedarberg Range; while at Genadendal we see an introduced tree, the cluster-pine, hardier than any of the indigenous trees, spreading itself self-sown up the rocky mountain-side, in spite of fires, drought, hot winds, and climatic vicissitudes that are too often the despair of the agriculturist.